



California Commissioning Collaborative



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Strategic Investments in the Commissioning Industry
Training and Education Strategies

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1 Executive Summary

Investor-owned and municipal utilities and other California stakeholders face increasingly rigorous mandates from the state to implement cost-effective, statewide energy efficiency programs. This proposal outlines two options for actions the CCC can undertake to make strategic investments in the commissioning industry and, with stakeholder support and funding, positively impact the achievement of the state's goals for energy efficiency, resource conservation and greenhouse gas emission reductions.

This proposal was originally developed in late 2007 to be a tool for CCC stakeholders to use in their planning processes for the 2009-2011 program and budget cycles, as well as a resource for discussions of the organization's long-term role in California's energy efficiency market.

The information that follows highlights the original proposal content related to training and education, with some introduction and background information to provide context.

1.1 Introduction

The CCC's current agenda, structure and funding address a broad range of issues and are intended to provide overarching support and infrastructure for commissioning in California. While significant contributions have been made to the industry, the Collaborative's influence has been diffuse and reactive – initiating multiple small projects that respond to a wide range of needs. In the current fast-paced environment of rigorous measures and mandates, a more progressive agenda is needed to effectively meet the needs of the CCC stakeholders, who can bring about meaningful and far-reaching impact on the state's energy efficiency initiatives.

1.2 Big and Bold Solutions

The CCC has the potential to provide larger solutions for California's energy efficiency initiatives. Taking advantage of the Collaborative's position in the energy efficiency market, its history of stakeholder support, and current movement in the industry toward more collaborative and integrated efforts, a new agenda of big and bold initiatives is poised to succeed.

Option 2 is a departure from the CCC's current project-based agenda to one that is program-based. It will require significant increases in funding, as well as possible changes in the organization's structure and management. This approach will result in:

- CCC leadership and influence in developing integrated energy efficiency policies and standards
- Increased cost-effectiveness of statewide retrocommissioning incentive programs
- Innovative and collaborative efforts that align with the state's energy efficiency initiatives
- Financially independent organization supported by revenue from products and services

Table 1: Summary of Big and Bold Solutions

Function	Strategy	Result
Administration & Project Management	Manage development and implementation of key initiatives while maintaining CCC administration and marketing activities	Strategic and fiscally responsible management of stakeholder funding to support large-scale initiatives and programs
Policies, Standards & Research	Influence and lead the development of commissioning and green building policies and standards in California	Long-term influence on the policies and standards leading to the development of a green building standard for the State of California
Measurement & Verification	Collaborate with the CPUC, stakeholders and industry experts to establish and adopt M&V standards for utility retrocommissioning programs	Statewide M&V standards that provide meaningful and accurate evaluation results targeted at integrated, cost-effective whole building performance
Comprehensive RCx Program Delivery Strategy	The CCC manages a statewide program that delivers a turnkey solution for retrocommissioning commercial buildings	The CPUC's directive for cost-effective, statewide programs is achieved
Training & Education	Develop technical training courses and college-level commissioning education programs	A skilled workforce of service providers able to deliver commissioning services to meet the demands of California's energy efficiency initiatives

2 CCC Background

In 2000, the California Commissioning Collaborative (CCC) was formed as an ad-hoc group interested in promoting building commissioning in California as a way to achieve better commercial building performance. By 2002, the group had established a broad agenda to support the growing commissioning industry in the state and gained support from major public and investor-owned utilities, the U.S. Department of Energy (DOE), and the California Department of General Services (DGS).

The organization's vision, mission and strategic plan were developed in December 2003 to guide the CCC over a five-year period, from 2004 to 2008. The CCC mission and vision are included in Appendix C. The strategic plan addressed five areas:

1. Improve market perceptions of commissioning
2. Address the economic drivers for commissioning
3. Target commissioning for specific market segments
4. Strengthen California's commissioning infrastructure
5. Expand market intelligence for the commissioning industry

The CCC currently receives funding from stakeholders who make up the CCC Board of Directors. The CCC Board of Directors receives guidance from an Advisory Council of industry professionals who have a vested interest in the health and growth of the commissioning industry in California. As a group, the Advisory Council makes recommendations to the Board concerning technical and other matters of importance to the CCC. The CCC's management functions, work plan and discussion of significant accomplishments to date are described in Appendix D and E.

Mandates and legislation from the State of California are a driving force for the CCC's actions. In December 2004, Governor Arnold Schwarzenegger signed Executive Order S-20-04 mandating reduced energy and resource consumption statewide. The Executive Order established the state's priority for energy and resource-efficient, high performance buildings to be achieved through sustainable building practices, energy efficiency and conservation. Since the Executive Order, the California legislature has continued to pursue additional mandates and policies with increasing requirements for resource efficiency and reduction.

In early 2007, the Board of Directors of CCC initiated a process to evaluate the organization's work plan and structure to ensure that the CCC's activities continue to meet the needs of the changing market for commissioning services in California. This effort was also intended to help examine the long-term purpose and plan for the CCC, and explore funding scenarios that will support the ongoing work of the organization. With input from the CCC Advisory Council, the Board has determined the highest priority activities that have potential to meet the stakeholders' needs in the short- and long-term, described in Section 3.

3 Strategies to Achieve Stakeholder Goals

Investor-owned and municipal utilities and other CCC stakeholders face increasingly rigorous mandates from the State of California to implement cost-effective, statewide energy efficiency programs. The CCC mission and purpose directly supports these energy-efficiency initiatives. The CCC Board of Directors initiated a process in 2007 to evaluate the CCC work plan to ensure that the Collaboratives's activities continue to meet the needs of the changing landscape in California.

In August 2007, the CCC Advisory Council developed a list of prioritized recommendations for consideration by the Board of Directors. The Advisory Council was asked to envision and clarify the CCC's role in helping owners achieve and sustain optimum building efficiency, focused on long-term strategies. The Board of Directors responded with articulation of their highest priorities, generally matching with the Advisory Council's ranking of recommended actions, prioritized as follows:

3.1 Priority 1: Policies, Standards & Research

Ensure the commissioning industry is prepared for California's "green wave" with increased involvement in policy and codes committees; potentially facilitating dialogue between CCC stakeholders and policy-makers; also work to standardize/evolve commissioning processes to meet California's needs. Find avenues for the CCC to streamline and/or accelerate these processes.

3.2 Priority 2: Measurement & Verification

Integrate CCC's work with CPUC policy-development process to be most effective in setting standardized validation procedures for retrocommissioning programs.

3.3 Priority 3: Comprehensive RCx Program Delivery Strategy

Develop a comprehensive, integrated service delivery model that leverages owners' long decision-making processes into a "one-stop-shop" for implementing RCx on a large scale.

- Aggregate and manage teams to provide services.
- Collaborate with utilities to design a model that will be accepted by retrocommissioning program requirements.
- Explore possible joint ventures with owners to retrocommission portfolios of buildings under single agreements.
- Consider and resolve conflict of interest issues relative to CCC participants' role in service deliver teams.

3.4 Priority 4: Education & Training

Consider long and short-term solutions for providing the education and training that will ensure an adequate workforce to deliver commissioning services needed in California.

Short-term – Provider-focused training to elevate expertise of existing practitioners and meet immediate needs of utilities.

Long-term – Large scale curriculum development and plan for distribution/adoption into the educational system; potential for PIER and/or State of California to support this type of activity.

4 Education and Training Strategies

The commissioning industry faces both short and long-term needs for training and education to ensure a skilled workforce will be available to meet the demands of California's energy efficiency initiatives now and for years to come. Current availability of experienced commissioning leads is expected to be insufficient to turn over the number of potential projects in program pipelines. Technical training at all levels is needed to elevate the level of skills and expertise of existing commissioning practitioners.

At the same time, the number of engineers entering the field is considered too small to keep up with growing demand for commissioning services. At the college level, students are not exposed to commissioning as a career path, and have limited opportunities to receive education that will prepare them to enter the field. Developing an educational methodology and curriculum – and a plan for adoption in California colleges and beyond – would be an enormous achievement towards ensuring an adequate workforce, long-term sustainability of buildings, and retrocommissioning initiatives in California, as well as across the nation.

Strategy: Develop technical training courses and college-level commissioning education programs.

Result: A skilled workforce of service providers able to deliver commissioning services to meet the demands of California's energy efficiency initiatives.

Scope

Technical Training

The CCC can support the immediate need for skilled commissioning practitioners by developing technical training programs. With guidance from CCC studies on education and training needs, the next step would be to identify the greatest areas of need and develop corresponding training courses. Development and delivery can be done in cooperation with the utility training centers, retrocommissioning programs, or with CCC pre-approved contractors.

These training courses and seminars will provide high-quality continued education that expands the breadth and depth of skills in the workforce. The CCC has created a foundation of knowledge around training needs and opportunities, and can use its connection to industry professionals as well as the utility training centers and professional and trade organizations to broaden the collective understanding of training needs and to help develop and deliver the material.

Offering courses in a variety of formats is a key strategy for reaching the greatest number of professionals who can benefit from training. Some examples of training formats include:

- Hands-on technical training that allows students to learn and apply techniques in real-world or simulated situations
- Classroom/lecture – either in-person or online provides introduction to new concepts, conveyed in theory and via case-studies
- Field-based training may take the form of a mentor relationship between senior and junior practitioners, allowing transfer of anecdotal and practical knowledge
- Multi-media – utilizing simulation tools and other technologies to put theory into practice

The CCC may consider developing training courses that result in a certificate of completion or some level of certification. This type of recognition could become part of the qualification process for participation in retrocommissioning programs, and may also assist building owners in selecting commissioning providers to lead their projects.

College-Level Curricula

Development of college-level commissioning curricula is a large-scale endeavor requiring subject matter experts, experts in educational methodology, and an advisory group representing the industry, educators and students. A skilled management team would provide a framework for managing a multi-phased scope of work, coordinating activities across the team and networking with all interested parties to ensure a smooth transition from development to implementation.

A number of approaches should be considered for effectiveness and feasibility:

- Electives and Seminars – present commissioning concepts through specialized courses. This approach will lead some students to direct their studies towards classes that prepare them for a career in commissioning. These classes can appropriately supplement programs in engineering, construction sciences, architecture and sustainability.
- Hands-On Experience – develop options for students to gain real-world experience through internships, co-ops, etc. Putting theory into practice is an effective way to reinforce knowledge and build new skills. Students can benefit greatly from “on-the-job” experiences in the commissioning field. For example:
 - Allow university and community college students to participate in or observe retrocommissioning investigation and implementation through the UC/CSU/IOU and community college partnerships.
 - Create university-based “Commercial Assessment Centers,” modeled after the U.S. Department of Energy’s Industrial Assessment Centers, to provide assessments of commercial buildings – analogous to a retrocommissioning investigation.
 - Provide funding and management for co-op internships in private engineering and commissioning firms to link college-level education to real-world experiences.

Once a methodology is determined and implemented, the next step will be to initiate adoption of the program. California institutions and state agencies will likely have been involved in the development of any new curriculum or educational program or initiative. These players must buy in to the methodology and approach, and be willing to adopt the program on a large scale across the state. Once established in California, the CCC should consider the potential revenue that can be generated by expanding the program to other states and even internationally.

Appendix A: Vision and Mission Statements

Vision Statement

Our Vision: The California Commissioning Collaborative is the recognized leader in the State of California for the promotion, development, and implementation of Building Commissioning practices, that result in significantly efficient, life cycle cost-effective, and high performance design, construction, and operation of sustainable buildings in every sector of the economy, without compromising the quality, comfort, productivity, and performance of both the building systems and occupants.

Mission Statement

Our Mission: The California Commissioning Collaborative is a group of government, utility and building services organizations and professionals committed to improving building and system performance by developing and promoting viable building commissioning practices in California.

Our Purpose: To facilitate the development of cost effective programs, tools, techniques and service delivery infrastructure that enables the implementation of the building commissioning process in new and existing buildings to ensure all possible energy and non-energy benefits, and improve overall building performance.

Our Business: To educate and inform members and identify opportunities, establish priorities, and promote solutions; To act as an incubator for ideas and provide a forum for collaboration and communication.

Our Values: The CCC is committed to providing leadership and promoting integrity in the commissioning industry through transparent operations, collaborative communication and the use of technically sound information.

Appendix B: CCC Agenda and Accomplishments

The CCC's activities have addressed a broad range of issues by providing research, tools, training and outreach to encourage the growth of the commissioning industry in California. This agenda addresses these purposes:

1. Support for Retrocommissioning Programs
2. Retrocommissioning Market Development
3. Resources for Commissioning of Existing Buildings
4. Resources for Commissioning of New Buildings
5. Educational Support for the Commissioning Industry

As stakeholder contributions are received, projects are initiated, contracted and completed. To date, the progress made on the CCC's work plan has been slow; however, significant milestones have been reached in a number of projects such as:

- Development and revision of Title 24 acceptance testing requirements for HVAC and lighting controls
- Market Research on the decision-making processes for owners of Class A commercial buildings and hospitals
- Development of templates, sample documents, calculation spreadsheets and data analysis tools to assist commissioning providers in their work
- Training on a range of topics, targeted to both owners and providers
- Development and distribution of resources for building owners, including guidelines, program information and provider listings

Detail on these activities and how the CCC has contributed to the commissioning industry and the goals of the Governor's Executive Order are described in "Roadmap for Achieving the Commissioning Goals of California's Green Building Executive Order," prepared in 2007 for California's Green Action Team Commissioning and Retrocommissioning Work Group (<http://resources.cacx.org/library/HoldingDetail.aspx?id=398>).